

# THE GASTROPOD *PLATYTEICHUM* IN THE PERMIAN OF WESTERN AUSTRALIA

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ABSTRACT. *Platyteichum johnstonei* sp. nov., *P. johnstonei*? and *P.*? sp. nov. are described. The holotype of *P. costatum* Campbell 1953, the type species, and of *P. coniforme* (Etheridge jun.) 1892 are figured and discussed; *P. costatum* may be a synonym of *P. coniforme*. *Platyteichum* Campbell 1953 appears to be closely related to *Mourlonia* de Koninck 1883 and *Mourlonopsis* Fletcher 1958. The species of *Platyteichum* occurring in Western Australia is considered to afford additional evidence for the correlation of the Ingelara Formation of the Bowen Basin of Queensland with the upper part of the Byro Group of the Carnarvon (North-west) Basin of Western Australia.

WITH the exception of those from the lower (Sakmarian) part of the Permian sequence, the marine Permian faunas of Western Australia differ sufficiently from those of Eastern Australia (Queensland, New South Wales, and Tasmania) to be placed in different faunal provinces (see Dickins and Thomas 1959). Thus correlation between the two areas has presented more than usual difficulties. The occurrence in Western Australia of the genus *Platyteichum* Campbell (1953, p. 23) with the type *P. costatum* Campbell (1953, p. 23, pl. 7, figs. 11–14) from the Ingelara Formation of Queensland is of interest, especially as one of the species described resembles the type species. The opportunity is taken of refiguring the holotype and discussing the relationship of the type species, *P. costatum*, to *Mourlonia*? *coniformis* Etheridge jun. (1892, p. 287, p. 41, fig. 5).

*Correlation of the Ingelara Formation with the sequence in Western Australia.* Evidence from the pelecypods considered in the previous paper indicates that the Ingelara Formation, which lies stratigraphically between the Cattle Creek Formation and the Mantuan *Productus* Bed, is younger than the Callytharra Formation but is not likely to be much younger than the Coolkilya Formation, the lowest formation of the Kennedy Group. Previous authors (Teichert 1941; Fletcher 1945) have suggested an approximate correlation between the Cundlego Formation of the Carnarvon (North-west) Basin and the Ingelara Formation (for a summary of the stratigraphical sequences in Western Australia and in Queensland see the immediately preceding paper). Fletcher based his conclusion on the occurrence of similar species of *Glyptoleda* in the Cundlego Formation and the Ingelara Formation. Because of its relative position in the Byro Group and its faunal relationship with the other formations of the Group, the Cundlego is regarded as of late Artinskian age (see Thomas and Dickins 1954). With regard to the age of the Ingelara Formation Campbell (1953, p. 5) states: 'Correlation with overseas faunas . . . would thus appear to suggest an age toward the region of the Artinskian–Kungurian boundary.' Campbell's conclusion thus supports that of the previous authors. The present evidence adds additional support to this correlation which may be modified to indicate that the Ingelara Formation can be correlated with the upper part of the Byro Group (Cundlego–Baker Formations).

In undescribed *Glyptoleda*-like forms from the lower part of the Byro Group, the V-ribbing characteristic of *Glyptoleda* is poorly developed, and forms with complex

ribbing similar to those of the Ingelara Formation are found in the Cundlego and Wandagee Formations. The species of *Platyteichum* which resembles *P. costatum* is found in the Wandagee Formation, the Norton Greywacke, and possibly the Coolkilya Greywacke. Another rather different species is found in the Norton Greywacke and in the younger Coolkilya Greywacke of the Kennedy Group.

*Relationship of PLATYTEICHUM to some other Pleurotomariid genera.* Although *Platyteichum* resembles *Mourlonia*, it differs especially in having a flat upper whorl profile, whereas *Mourlonia* has a gently convex upper whorl. On the other hand it differs considerably from such genera as *Peruvispira* and *Ptychomphalina*. (The relationship of *Mourlonia* and *Ptychomphalina* is being dealt with elsewhere (Dickins 1961).) Its whorl cross-section is rounded and its outline simple; the ornament is composed of both spiral elements and elements parallel to the growth-lines and may have nodes where the two intersect. The spiral elements are simple, comprising threads which are more or less equidistant and of equal prominence. The umbilicus, as in *Mourlonia*, may be closed in the adult and a 'false umbilicus' may be present. *Platyteichum* also resembles *Mourlonopsis* Fletcher (1958, p. 129), which appears to differ mainly in having the whorl cross-section entirely convex as in *Mourlonia*, whereas in mature specimens of *Platyteichum* the upper part of the whorl is flat or concave where it rises to meet the previous whorl.

*Platyteichum* also has some resemblance to *Baylea* de Koninck 1883, which, however, can be readily separated by the marked step-like character of its whorls and the width of its slit-band. Amongst long-established genera it seems to come closest to *Mourlonia* and it is thus significant that in its earlier whorls *Platyteichum* is even closer to *Mourlonia*.

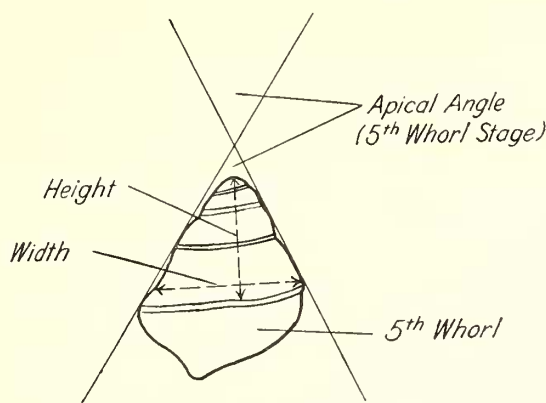
## SYSTEMATIC DESCRIPTIONS

### Genus PLATYTEICHUM Campbell 1953

*Type species.* *Platyteichum costatum* Campbell (1953, p. 23, pl. 7, figs. 11–14) by original designation of Campbell (1953, p. 23).

*Discussion.* *Platyteichum costatum* seems to be a synonym of *Mourlonia? coniformis* Etheridge jun. (1892, p. 287, pl. 41, fig. 5) but until further, better-preserved, topotype material of *M.? coniformis* is available, this problem cannot be satisfactorily solved. However, no change in the generic diagnosis would be required. Both the holotype of Campbell's species and Etheridge's single specimen of *M.? coniformis* (Queensland Museum No. F17/1220) are refigured in the accompanying plate. Etheridge records the locality of his specimen as 'Banana Creek, near Banana'; the lithology and the rest of the fauna recorded by Etheridge (1892) from this locality leave no doubt that the specimen is from the Flat Top Formation (Glover 1959) identified by Glover's unpublished report to Mines Administration Pty. Ltd. Dr. D. Hill (pers. comm.) considers that this formation is faunally intermediate between the Ingelara Formation and the Mantuan *Productus* Bed. Collections from this formation are housed in the Museum of the Department of Geology of the University of Queensland. Unfortunately none of the other specimens of *Platyteichum* is better preserved than Etheridge's. Although some have an even lower spire than Etheridge's specimen, many of these are squashed and distorted.

To allow a more accurate comparison of the two specimens, the dimensions have been related to the slit-band of the fifth whorl as shown in the text-figure.



TEXT-FIG. 1. *Platyteichum* Campbell,  $\times 1$ .

	<i>P. coniforme</i> (Qld. Mus. No. F17/1220)	<i>P. costatum</i> (Holotype. Qld. Univ. Geol. Mus. No. F14,181)
Height . . . . .	12 mm.	15 mm.
Width . . . . .	19 mm.	20 mm.
Apical angle—fifth-whorl stage . . . . .	63°	61°
third-whorl stage . . . . .	95°	91°
Number of spiral lirae on upper surface of fifth whorl . . . . .	About 14	About 13
Number of spiral lirae on lower surface of fifth whorl . . . . .	..	About 22

The only difference in dimensions of possible significance is that in the height of the spire. This is probably an original feature because, although Etheridge's specimen is squashed laterally, the aboral side does not appear to be markedly distorted. My examination, however, of the type specimens and many other specimens from the type locality indicates considerable variation in the height of the whorl relative to width, and Etheridge's specimen of *P. coniforme* appears to come within these limits of variation. Apart from the dimensions the two appear to be similar in every important respect: the width of the slit-band on the fifth whorl, the number and character of the spiral lirae, and the shape of the growth-lines. In *P. costatum* some of the growth-lines are more distinctly marked than others, whereas they are more uniform in *Platyteichum coniforme*; but this can hardly be regarded as significant. The earlier whorls in both are similar, and differ from the later whorls: the upper surfaces of the second and third whorls are rounded, in contrast to the fifth whorl in which the upper surface is straight or even slightly concave, and the sutures are deeper and more distinctly marked. In these features the fourth whorl is intermediate between the third and fifth. The apical angle of the

earlier whorls is considerably greater than in the later whorls. Both the sutures and the shape of the second and third whorls are thus closer to *Mourlonia* than the later whorls.

An examination of the type specimens also shows that the umbilicus was narrow and open at the earlier growth stages but that in at least some mature specimens the umbilicus is closed by callus. Removal of matrix from the holotype shows that the original open umbilicus is closed by callus, but a small external umbilicus ('false umbilicus') is left between the base of the whorl and the columellar lip.

*Platyteichum johnstonei* sp. nov.

Plate 17, figs. 9-12

*Diagnosis.* Similar to *P. costatum* (see Plate 17, figs. 4-6), distinguished by having the slit-band slightly higher above the periphery and the whorl cross-section slightly more rounded, lacks the slight but distinct changes in direction of the outline at the bottom of the slit-band and below the slit-band.

*Description of holotype.* Spire of moderate height, probably originally with five whorls; but the top part of the spire has not been preserved. The sutures are shallow but distinct. The upper surface meets the preceding whorl just below the slit-band at an angle near to that of the apical angle so that the outline is only slightly indented. The earlier whorls are convex and rounded, but the uppermost part of the final whorl is straight or slightly concave. The slit-band is situated slightly above the periphery. The ornament comprises transverse lirae paralleling the growth, and spiral lirae more or less equal to each other in prominence. The lirae bounding the slit-band are hardly more distinct than the rest of the spiral ornament. The growth-lines (or transverse lirae), after leaving the suture, swing backwards in an even curve to the slit-band. Below the slit-band they swing slightly forward and then down over the outer surface of the whorl and backwards over the base in a gentle even curve. Where the transverse and spiral ornament cross, nodes are formed. Most of the base including the umbilical region is not exposed. *Paratypes.* These confirm the features found in the holotype. Paratype B has five whorls; the width relative to the height of the spire is greater than in the holotype but this, at least in part, results from squashing. Paratype C, which is also partly squashed, shows a narrow external umbilicus.

*Dimensions* (in mm.)

	<i>Height</i>	<i>Width</i>	<i>Apical angle</i>	<i>No. of lirae above slit-band on last whorl</i>	<i>No. of lirae below slit-band on last whorl</i>
Holotype . .	22 (approx.)	18	72°	9	17+
Paratype A . .	31 (approx.)	24 (approx.)	67°	9	..
Paratype B . .	32	26 (approx.)	88°	..	..
Paratype C . .	29	22	68°	9	30 (approx.)

*Occurrence.* Holotype (CPC108),<sup>1</sup> lat. 24° 22' 26" S., long. 115° 10' 00", 4.5 miles west of south of Merlinleigh Homestead, 97 feet above base of Norton Greywacke. Paratype A (UWA42,115), there is some doubt about the locality from which the specimen was collected but it appears to be from about 2 miles north-north-east of Trig. K56, from top part of Bulgadoo Shale or more likely from bottom part of Cundlego Formation in fault block south of Barrabiddy Creek. Paratype B (UWA42,116), from lower part of Wandagee Formation, west side of Minilya syncline, south of Minilya River, west of Coolkilya Pool. Paratype C (UWA42,117), from lower part of Wandagee Formation, west side of Minilya syncline, south of Minilya River, west of Coolkilya Pool. The description is based on five specimens.

*Discussion.* *P. johnstonei* appears to be most closely related to *P. costatum*, from which it can be distinguished by the more rounded whorl outline and by having the slit-band higher and the upper surface slightly less concave. Less closely related is *Pleurotomaria breuensis* Reed (1932, p. 64, pl. 12, figs. 2-4a) from the Agglomeratic Slate of Kashmir, which seems also referable to *Platyteichum*. The species is named after Mr. M. H. Johnstone, formerly of the Bureau of Mineral Resources, Geology and Geophysics, and now of West Australian Petroleum Pty. Ltd. Mr. Johnstone has done considerable geological work in Western Australia and collected material from the type locality of this species.

*Platyteichum johnstonei* Dickins?

Plate 17, figs. 1-3

*Description.* A single specimen similar in general shape to *Platyteichum johnstonei* but distinguished by having the whorl cross-section slightly more symmetrical so that the spire is more step-like. A narrow umbilicus penetrates between the whorls. The character of the slit-band and the ornament is similar to that of *P. johnstonei*.

*Dimensions* (in mm.)

	Height	Width	Apical angle	No. of lirae above slit-band on last whorl	No. of lirae below slit-band on last whorl
CPC109 . . . . .	27 (approx.)	20	70°	9	About 29

*Occurrence.* Figured specimen (CPC109), Registered No. F17,076, 1¼ miles south-east of Muderong Bore, Middaly Station, from the Coolkilya Greywacke.

*Discussion.* Because of the difference in shape and the presence of an umbilicus it seems best to separate provisionally this specimen from *P. johnstonei*, although additional specimens may show that it is only a variety. The specimen is preserved as a limonitic replacement and the umbilicus may be open because the callus is not preserved.

Both *P. johnstonei* and *P. johnstonei?* somewhat resemble *Pleurotomaria timorensis* Wanner (1922, p. 20, pl. 151 (1), figs. 9a-b) from the Permian Basleo Beds of Timor. In *Pleurotomaria timorensis*, however, the step-like character of the spire is strongly developed and it does not seem possible to include it in *Platyteichum* unless a rather wide meaning is given to the genus.

<sup>1</sup> CPC—Commonwealth Palaeontological Collection, Canberra; UWA—University of Western Australia Collection.

*Platyteichum?* sp. nov.

Plate 17, figs. 7-8

*Description.* The spire is of moderate height, with five whorls in mature specimens. The sutures are shallow but distinct. The slit-band is situated slightly above the periphery, the suture lying slightly but definitely below the slit-band. The whorl cross-section is gently convex except immediately below the suture, where it is flat or concave for a short distance as it rises to the previous whorl; it is sufficiently symmetrical to give a stepped character to the spire. The ornament comprises spiral and transverse elements and is similar to that of *P. johustonei* except that there are more spiral lirae. The spiral lirae are of about equal prominence and the lirae bounding the slit-band are similar or only slightly more prominent than the others. The growth-lines are similar to those in *P. johustonei*. In mature specimens the umbilicus was probably almost filled with callus, leaving only a small external umbilicus. The early whorls of all the specimens are poorly preserved.

*Dimensions* (in mm.)

	Height	Width	Apical angle	No. of lirae above slit-band on last whorl	No. of lirae below slit-band on last whorl
Figured Specimen A	19 (approx.)	20	84°	11	23+
Figured Specimen B	22 (approx.)	23	74°	About 15	..
CPC112 . . .	22	24 (approx.)	..	About 12	..

*Occurrence.* Figured Specimen A (CPC110), lat. 24° 22' 26" S., long. 115° 10' 00", 4.5 miles west of south of Merlinleigh Homestead, 97 feet above base of Norton Greywacke. Figured Specimen B (CPC111), lat. 24° 51' 21" S., long. 115° 10' 53", 3¼ miles from K38 on a bearing of 197° and 5 miles from Walbarune Peak (K40) on a bearing of 340°, Coolkilya Greywacke, 108 feet above base. CPC112, 1¾ miles south-east of Muderong Bore, Middalya Station, from Coolkilya Greywacke. One specimen from near Merlinleigh, four specimens from near K38, and two specimens from near Muderong Bore.

*Discussion.* In the ornament and the general character of the spire *P.?* sp. nov. is similar to *P. johustonei*. It differs particularly, however, in the lesser proportion of the length to width, the greater number of spiral lirae and the greater symmetry of the whorl cross-

## EXPLANATION OF PLATE 17

Figs. 1-3. *Platyteichum johustonei* Dickins?, three views CPC109, ×1.

Figs. 4-6. *Platyteichum costatum* Campbell 1953, Queensland University Museum (QUM) F14,181, three views of the holotype, ×1.

Figs. 7-8. *Platyteichum?* sp. nov., ×1. 7, Figured specimen A, CPC110. 8, Figured specimen B, CPC111.

Figs. 9-12. *Platyteichum johustonei* sp. nov. 9, Holotype, CPC108, ×2. 10-11, Two views of Paratype B, UWA42,116, ×1. 12, Paratype A, UWA42,115, ×1.

Figs. 13-14. *Platyteichum coniforme* (Etheridge jun.) 1892, Queensland Museum No. F17/1220, two views of holotype, ×2.

Figs. 15-19. *Atomodesma (Atomodesma) bisulcata* sp. nov., ×1. 15, Paratype B, QUM F27,122. 16, 18-19, Holotype QUM F27,124, lateral, anterior and dorsal views. 17, Paratype A, QUM27,121.

